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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,334	09/07/2007	Matthias Blessing	095309.57214US	6871

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CROWELL & MORING LLP  
INTELLECTUAL PROPERTY GROUP  
P.O. BOX 14300  
WASHINGTON, DC 20044-4300

EXAMINER
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GIMIE, MAHMOUD

ART UNIT	PAPER NUMBER
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3747

MAIL DATE	DELIVERY MODE
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09/09/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/563,334	<b>Applicant(s)</b> BLESSING ET AL.	
	<b>Examiner</b> Mahmoud Gimie	<b>Art Unit</b> 3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 18-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18, 19, 22-27, 29, 30 and 32 is/are rejected.
- 7) ☒ Claim(s) 20, 21, 28, 31, 33 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 18 and 25 are rejected under 35 U.S.C. 102 (b) as being anticipated by Tashiro et al. (WO 02/066813, equivalent to US 6,901,747).

Tashiro et al. disclose a method for operating an internal combustion engine with compression ignition, comprising: injecting fuel into a combustion chamber as a plurality of fuel jets via an injection nozzle which has a nozzle needle and injection bores, such that some of the fuel is injected as a main injection (F<sub>m</sub>) and thereafter a fuel quantity (F<sub>as</sub>, F<sub>am</sub>) is injected as a cyclical post-injection into the combustion chamber, wherein the cyclical post-injection partial quantities formed occurs in different magnitudes (fig. 1(c)).

Regarding claim 25, wherein part of the fuel is injected as a pre-injection (F<sub>p</sub>) with an injection pressure which is less than or equal to that of the main injection (F<sub>m</sub>).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 19, 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tashiro et al. (WO 02/066813) in view Shafer et al. (US 2003/0066509).

Regarding claim 19, Tashiro et al. disclose all the limitations as applied to claims 18 and 25 above, except for the fuel jet in the combustion chamber is limited to less than a distance to the combustion chamber boundary.

Shafer et al. discloses fuel jets in the combustion chamber limited to less than a distance to the combustion chamber boundary; see figures 1b and 1c.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Tashiro et al. by limiting the fuel jets to less than a distance to the combustion chamber boundary as disclosed by Shafer et al. in order to prevent wetting of the cylinder surfaces and reduce emissions; see paragraph 0036.

Regarding claim 29, Shafer et al. disclose the fuel jet offset of laterally shifted by a swirling motion formed in the combustion chamber; see figures 1b and 1c.

Regarding claim 32, Shafer et al. disclose an inwardly opening nozzle needles and plurality of injection bores (276, 278), and spray-hole cone angle of from 80° to 140° is settable between the injected fuel jets; see figures 18a-18c.

5. Claims 22-24, 26, 27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tashiro et al. (WO 02/066813)

Regarding claims 22-24, 26 and 27, Tashiro et al. discloses all the limitations as applied to claims 18 and 25 above, except for the crankshaft angle range where the fuel injection occurs.

Tashiro et al. however disclose that the fuel injection is controlled as a function of the crankshaft angle (horizontal axis of figure 1).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to vary the crankshaft angle where the fuel injection occurs in order to optimize the timing fuel injection.

Regarding claim 30, it would have been obvious to one skilled in the art that an upper movement of the needle creates cavitation flow in the injection bores.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 18 and 25 have been considered but are moot in view of the new ground(s) of rejection.

### ***Allowable Subject Matter***

7. Claims 20, 21, 28, 31, 33 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Gimie whose telephone number is 571-272-4841. The examiner can normally be reached on Monday-Friday between 7 a.m. -3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen K. Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MG/  
/Mahmoud Gimie/  
Primary Examiner, Art Unit 3747